BALLOON FLIGHT RECORD STATUS REPORT

as of 30 December 1960

by

John R. Winckler

School of Physics
University of Minnesota

Experiments carried out as part of the

International Geophysical Cooperation in 1960

Supported by
National Science Foundation
National Aeronautics and Space Administration
Office of Naval Research

Cosmic Ray Group

May 1961

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This tabulation describes balloon flights conducted at Minneapolis, Minnesota, U.S.A. and Fort Churchill, Manitoba, Canada, during the period 1 January 1958 to 30 December 1960. This report is a continuation of two previous status reports from the School of Physics for similar high altitude monitoring balloon flights dated 15 February 1959 and 31 December 1959 and covering the IGY-IGC period. These previous reports have been distributed to the World Data Centers and to other interested persons. A complete tabulation of the balloon ion chamber and Geiger counter data for all flights during the IGY period has been distributed to the Data Centers ("Tabulation of High Altitude Radiation Data for the IGY Period," Technical Report No. CR-28, by J. A. Winckler). A companion report, "Balloon Study of High Altitude Radiations During the International Geophysical Year," (published in Jrnl of Geophys Research, 65, 1331-1359, May 1960) describes the instrumentation previously used. The present instrumentation has been improved and modified over that used earlier. A description of the new apparatus is contained in two technical reports of the Cosmic Ray Group, School of Physics, University of Minnesota, entitled "Analysis of Balloon Observations During the April 1960 Solar Cosmic Ray Events," by A. J. Masley, and "A Study of Auroral X-Rays at Minneapolis Between 23 August 1959 and 1 August 1960," by T. C. [illegible]. These reports contain a preliminary analysis of solar cosmic ray [illegible] and auroral x-ray events during the above period. Reference to such

recent publications from this balloon program will be found in the above two technical reports. A further list of recent publications resulting from this high altitude balloon program is attached as a bibliography.

The flights during this period covered the great series of geophysical events in November 1960. Because of the large amount of data, only very preliminary results are presently available.

The table gives the flight number, launch time, launch location, duration, and type of instrumentation used on each of the flights. The flight duration is measured from launch time. The floating-pressure altitude of the current balloon system is 6 mb. In general, the flights attain this altitude about two hours after the stated launch time. The balloons do not always float at a constant altitude, however, so that the detailed time-pressure curve for each flight is necessary for final analysis.

An index for the types of instruments used is attached at the end of the tabulation.

The project will endeavor to furnish the original data from these flights if it is needed by qualified scientists. These data are plotted on a standard format except for cases of exceptionally high intensity. The graphs include the readings of the vertical telescopes, the two counters separately, and the ionization rate. Total field magnetometer records are also taken at Minneapolis continuously and are available on the same time basis as the balloon flight data. The nuclear emulsion analysis is carried out as usual on the basis of interest in specific events. This analysis is by nature very lengthy and the results appear from time to time in the publications of the nuclear emulsion group of the School of Physics, University of Minnesota.

Inquiries about this project should be addressed to John R. Winckler, Professor of Physics, School of Physics, University of Minnesota, Minneapolis 14, Minnesota.

Flight No.	Launch Time (UT)	Launch Date (UT)	Launch Location	Hours Duration (Launch to Termination)	Instrumentation
17	2317	7 Jan 1960	Minneapolis	> 6	Standard
18	0521	11 Jan 1960	Minneapolis	> 4	Standard
19	0458	13 Jan 1960	Minneapolis	4-1/2	Standard
20	0101	21 Jan 1960	Minneapolis	> 4-3/4	Standard
21S	1508	4 Feb 1960	Minneapolis	Negligible	SCI, NE
22S	1505	5 Feb 1960	Minneapolis	3-1/4	SCI, NE
23	1402	6 Feb 1960	Minneapolis	3-3/4	Standard
24	1424	11 Feb 1960	Minneapolis	4	Standard
25	0801	18 [illegible] 1960	Minneapolis	> 2-1/4	Standard
26	0556	20 Feb 1960	Minneapolis	4-1/2	Standard
27	0620	23 Feb 1960	Minneapolis	5	Standard
28	1444	28 Feb 1960	Minneapolis	> 5	Standard
29	1453	5 Mar 1960	Minneapolis	4	Standard
30	1438	9 Mar 1960	Minneapolis	> 5-3/4	Standard
31	0445	17 Mar 1960	Minneapolis	3	Standard
32	0429	18 Mar 1960	Minneapolis	4	Standard
33	1357	23 Mar 1960	Minneapolis	4 1/2	Standard
34	0525	30 Mar 1960	Minneapolis	Negligible	Standard
35	0328	31 Mar 1960	Minneapolis	> 4	Standard
36	1925	31 Mar 1960	Minneapolis	> 4-1/4	Standard
37	0140	1 Apr 1960	Minneapolis	> 4	Standard
38	0837	1 Apr 1960	Minneapolis	> 4	Standard
39	1458	1 Apr 1960	Minneapolis	Negligible	Standard
40H	0845	1 Apr 1960	Minneapolis	3-1/2	NE
41	0133	2 Apr 1960	Minneapolis	> 4-3/4	Standard

Flight No.	Launch Time (UT)	Launch Date (UT)	Launch Location	Hours Duration (Launch to Termination)	Instrumentation
42	0825	2 Apr 1960	Minneapolis	> 5	Standard
43	0339	3 Apr 1960	Minneapolis	> 5-1/4	Standard
44	0327	6 Apr 1960	Minneapolis	4	Standard
45	0328	9 Apr 1960	Minneapolis	6	Standard
46	1428	10 Apr 1960	Minneapolis	8-1/2	Standard
47	0633	11 Apr 1960	Minneapolis	15-3/4	Standard
48	0101	19 Apr 1960	Minneapolis	12	Standard
49	0316	23 Apr 1960	Minneapolis	10-1/2	Standard
50	0118	26 Apr 1960	Minneapolis	> 21	Standard
51	0059	28 Apr 1960	Minneapolis	> 10	Standard
52	1122	28 Apr 1960	Minneapolis	9	Standard
53	0058	29 Apr 1960	Minneapolis	7-1/2	Standard
54	2048	29 Apr 1960	Minneapolis	6	Standard
55	0337	30 Apr 1960	Minneapolis	8-1/2	Standard
56	1522	30 Apr 1960	Minneapolis	8	Standard
57	0230	1 May 1960	Minneapolis	8-1/2	Standard
58	0231	4 May 1960	Minneapolis	Negligible	Standard
59	1458	4 May 1960	Minneapolis	11-1/4	Standard
60	1928	4 May 1960	Minneapolis	> 1-1/2	Standard
61	0109	5 May 1960	Minneapolis	> 24	Standard
62	0131	6 May 1960	Minneapolis	Negligible	Standard
63	0310	7 May 1960	Minneapolis	22	Standard
64	1009	8 May 1960	Minneapolis	Negligible	Standard
65	0445	9 May 1960	Minneapolis	> 20-1/2	Standard
66	0336	10 May 1960	Minneapolis	> 11	Standard

Flight No.	Launch Time (UT)	Launch Date (UT)	Launch Location	Hours Duration (Launch to Termination)	Instrumentation
67	0321	11 May 1960	Minneapolis	9	Standard
68S	1140	12 May 1960	Minneapolis	> 14-1/2	SCI, NE
69	0115	14 May 1960	Minneapolis	11	Standard
70	0145	15 May 1960	Minneapolis	9-3/4	Standard
71	0137	21 May 1960	Minneapolis	Negligible	Standard
72	0313	24 May 1960	Minneapolis	> 10-3/4	Standard
73	1100	3 June 1960	Minneapolis	Negligible	Standard
74	1120	4 June 1960	Minneapolis	8-1/2	Standard
75	0122	5 June 1960	Minneapolis	9-1/2	Standard
76	0301	9 June 1960	Minneapolis	10-3/4	Standard
77	0807	22 June 1960	Minneapolis	9-3/4	Standard
78G	1808	24 June 1960	Minneapolis	> 6	IC, SC-S, NE
79	0150	26 June 1960	Minneapolis	> 9-1/2	Standard
80S	0620	27 June 1960	Minneapolis	9-1/2	SCI, NE
81	0154	28 June 1960	Minneapolis	> 6-3/4	Standard
82	0138	29 June 1960	Minneapolis	7-1/4	Standard
83	0223	30 June 1960	Minneapolis	8-1/4	Standard
84	0200	1 July 1960	Minneapolis	> 6-1/4	Standard
85	1143	13 July 1960	Minneapolis	> 7-1/2	Standard
86	0256	14 July 1960	Minneapolis	> 8	Standard
87S	0230	16 July 1960	Minneapolis	> 7-1/4	SCI, NE
88	0200	19 July 1960	Minneapolis	Negligible	Standard
89	0223	19 July 1960	Minneapolis	Negligible	Standard
90	0142	21 July 1960	Minneapolis	> 6-1/2	Standard
91	0400	22 July 1960	Minneapolis	Negligible	Standard

Flight No.	Launch Time (UT)	Launch Date (UT)	Launch Location	Hours Duration (Launch to Termination)	Instrumentation
92	0246	23 July 1960	Minneapolis	12-1/4	Standard
93	0151	27 July 1960	Minneapolis	14-1/2	Standard
94S	0305	31 July 1960	Minneapolis	> 10-1/2	SCI and Standard
95	0734	3 Aug 1960	Minneapolis	15	Standard
96	0154	11 Aug 1960	Minneapolis	> 20	Standard
97	0115	17 Aug 1960	Minneapolis	19-1/2	Standard
98	0106	18 Aug 1960	Minneapolis	>19-1/2	Standard
99	0226	19 Aug 1960	Minneapolis	16-1/2	Standard
100	0112	20 Aug 1960	Minneapolis	14-1/2	Standard
101	0624	27 June 1960	Churchill, Man., Canada	9-1/2	Standard
102	1901	27 June 1960	Churchill, Canada	>19	Standard
103	1843	28 June 1960	Churchill, Canada	>16	Standard
104	1620	29 June 1960	Churchill, Canada	>14	Standard
105	1252	30 June 1960	Churchill, Canada	>13	Standard
106	1645	8 July 1960	Churchill, Canada	10	Standard
107	0758	9 July 1960	Churchill, Canada	>13-1/4	Standard
108	1646	13 July 1960	Churchill, Canada	5-1/2	Standard
109	0751	15 July 1960	Churchill, Canada	>13	Standard
110	0754	16 July 1960	Churchill, Canada	22	Standard
111	1157	18 July 1960	Churchill, Canada	2-1/4	Standard
112	1744	21 July 1960	Churchill, Canada	19-3/4	Standard
113	2125	31 July 1960	Churchill, Canada	19-1/4	Standard
114	0730	3 Aug 1960	Churchill, Canada	6	Standard
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Flight No.	Launch Time (UT)	Launch Date (UT)	Launch Location	Hours Duration (Launch to Termination)	Instrumentation
117	0329	16 Aug 1960	Churchill, Canada	27	Standard
118	0244	18 Aug 1960	Churchill, Canada	30	Standard
119	1642	19 Aug 1960	Churchill, Canada	>40	Standard
120	1353	23 Aug 1960	Churchill, Canada	7-1/2	Standard
121	0343	1 Sept 1960	Churchill, Canada	>26-1/4	Standard
122	2012	2 Sept 1960	Churchill, Canada	>32-1/2	Standard
123H	1500	3 Sept 1960	Churchill, Canada	5	NE
124	2101	4 Sept 1960	Churchill, Canada	>13-3/4	Standard
125	0217	6 Sept 1960	Churchill, Canada	>25	Standard
126	0341	7 Sept 1960	Churchill, Canada	>25	Standard
127	0201	15 Sept 1960	Churchill, Canada	>22-1/2	Standard
128	1320	2 Nov 1960	Churchill, Canada	11-1/4	Standard
129	1110	4 Nov 1960	Churchill, Canada	>10-1/4	Standard
130	1100	5 Nov 1960	Churchill, Canada	>13-1/4	Standard
131	0344	21 Aug 1960	Minneapolis	12	Standard
132	0202	24 Aug 1960	Minneapolis	13-1/4	Standard
133	0159	30 Aug 1960	Minneapolis	12-1/4	Standard
134	0119	31 Aug 1960	Minneapolis	20-1/4	Standard
135	0132	1 Sept 1960	Minneapolis	23-1/4	Standard
136	0335	2 Sept 1960	Minneapolis	22	Standard
137	0122	3 Sept 1960	Minneapolis	25	Standard
138	0725	3 Sept 1960	Minneapolis	9-1/2	Standard
139	0105	4 Sept 1960	Minneapolis	25	Standard
140S	0617	4 Sept 1960	Minneapolis	18	SCI, NE
141	1200	4 Sept 1960	Minneapolis	4-1/2	Standard
142	0140	5 Sept 1960	Minneapolis	>27-1/2	Standard

Flight No.	Launch Time (UT)	Launch Date (UT)	Launch Location	Hours Duration (Launch to Termination)	Instrumentation
143	1300	5 Sept 1960	Minneapolis	>12-1/4	Standard
144	0115	6 Sept 1960	Minneapolis	27-1/2	Standard
145	0210	7 Sept 1960	Minneapolis	> 23	Standard
146	0208	15 Sept 1960	Minneapolis	>30-1/4	Standard
147	0733	18 Sept 1960	Minneapolis	7-1/2	Standard
148	1229	21 Sept 1960	Minneapolis	8-1/2	Standard
149	0946	26 Sept 1960	Minneapolis	6-1/4	Standard
150	1222	27 Sept 1960	Minneapolis	6-3/4	Standard
151	0657	6 Oct 1960	Minneapolis	> 11	Standard
152	0114	7 Oct 1960	Minneapolis	> 7	Standard
153	1018	7 Oct 1960	Minneapolis	8	Standard
154	1928	7 Oct 1960	Minneapolis	7-1/4	Standard
155	0031	8 Oct 1960	Minneapolis	> 8-1/4	Standard
156	1305	15 Oct 1960	Minneapolis	6-1/2	Standard
157	2314	25 Oct 1960	Minneapolis	> 3	Standard
158	0407	26 Oct 1960	Minneapolis	6	Standard
159	1230	2 Nov 1960	Minneapolis	5-1/2	Standard
160	0954	4 Nov 1960	Minneapolis	14	Standard
161	0103	5 Nov 1960	Minneapolis	24-1/2	Standard
162	0515	8 Nov 1960	Minneapolis	Negligible	Standard
163	1858	8 Nov 1960	Minneapolis	> 3	Standard
164	0232	11 Nov 1960	Minneapolis	20	Standard and extra IC
165	0014	12 Nov 1960	Minneapolis	> 12-3/4	Standard
166	1835	12 Nov 1960	Minneapolis	> 6	Standard
167	0017	13 Nov 1960	Minneapolis	> 5	Standard

Flight No.	Launch Time (UT)	Launch Date (UT)	Launch Location	Hours Duration (Launch to Termination)	Instrumentation
168G	0555	13 Nov 1960	Minneapolis	6-1/4	IC, SC-S, NE
169S	1107	13 Nov 1960	Minneapolis	5	SCI, SC, NE
170	2037	13 Nov 1960	Minneapolis	>9-1/2	Standard and extra IC
171	0310	14 Nov 1960	Minneapolis	2-3/4	Standard
172	1120	14 Nov 1960	Minneapolis	>11-1/4	Standard
173	0258	15 Nov 1960	Minneapolis	> 9	Standard
174G	1222	15 Nov 1960	Minneapolis	6	IC, SC-S, NE
175	1934	15 Nov 1960	Minneapolis	>4-1/4	Standard
176	0058	15 Nov 1960	Minneapolis	Negligible	Standard
177	0224	16 Nov 1960	Minneapolis	>10	Standard
178	0726	16 Nov 1960	Minneapolis	> 10	Standard and extra IC
179	0251	17 Nov 1960	Minneapolis	8-1/2	Standard and extra IC
180	1900	17 Nov 1960	Minneapolis	> 3	Standard
181	0057	18 Nov 1960	Minneapolis	> 8	Standard
182	1418	19 Nov 1960	Minneapolis	8	Standard
183	0302	22 Nov 1960	Minneapolis	7-1/4	Standard
184	0321	24 Nov 1960	Minneapolis	6	Standard
185	0400	1 Dec 1960	Minneapolis	2	Standard
186	0325	2 Dec 1960	Minneapolis	9-1/4	Standard
187	0440	5 Dec 1960	Minneapolis	>16-1/4	Standard
188	0248	7 Dec 1960	Minneapolis	>12-1/4	Standard
189	1721	7 Dec 1960	Minneapolis	8-1/4	Standard
190	0036	8 Dec 1960	Minneapolis	11-1/4	Standard
191	1026	9 Dec 1960	Minneapolis	13	Standard

Flight No.	Launch Time (UT)	Launch Date (UT)	Launch Location	Hours Duration (Launch to Termination)	Instrumentation
192	0038	16 Dec 1960	Minneapolis	>12-1/4	Standard
193	0324	17 Dec 1960	Minneapolis	> 7-3/4	Standard
194	0323	28 Dec 1960	Minneapolis	>6	Standard
200	0015	7 Nov 1960	Churchill, Canada	>6-1/2	Standard
201	0600	9 Nov 1960	Churchill, Canada	>13-3/4	Standard
202	0307	11 Nov 1960	Churchill, Canada	>9	Standard
203	----	12 Nov 1960	Churchill, Canada	Negligible	Standard
204	0545	13 Nov 1960	Churchill, Canada	>13-3/4	Standard
205H	1715	14 Nov 1960	Churchill, Canada	3-1/2	NE
206	2215	16 Nov 1960	Churchill, Canada	>24	Standard

Instrumentation Code:

IC = Ion Chamber

SC = Single Geiger Counter (Brass)

SC-A = Single Geiger Counter (Aluminum)

SC-S = Single Geiger Counter (Steel)

NE = Nuclear Emulsions

SCI = Scintillation Counter

GT = Geiger Telescope

Standard = IC, SC, SC-A, NE, GT

> = Termination time not known accurately at time of this report.

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